

May 31, 1991

City of Seattle
Engineering Plan Review
Municipal Bldg.
600 4th Ave.
Seattle, Washington 98104

Attn: Rick Lowthian

Re: Ash Grove Cement West Proposed Detention Facility

USEPA SF



1261666

Dear Rick:

Enclosed are four (4) sets of engineering plans, computations and pump data which relate to the above subject project. The following will summarize the project development to date, and more importantly, will provide a report of the correspondence and coordination that has occurred between our office and the City of Seattle thus far.

PROJECT BACKGROUND

Ash Grove has previously submitted drainage plans to the City of Seattle as part of on-site improvements which are currently under construction. It is our understanding that these drainage plans have been reviewed and approved by Neil Watts of Plan Review. This original plan will essentially be adhered to with the one major difference being a change in ultimate stormwater disposal location. Whereas the previous plan indicated stormwater discharge to an existing on-site pond, the proposed scheme will provide on-site subsurface detention and controlled outflow to the City storm sewer located in East Marginal Way South.

Currently, stormwater runoff generated at the facility is routed over the surface and through a fairly elaborate piping system to a holding pond located adjacent to the east bank of the Duwamish Waterway.

Bearing cooling water, truck washout and occasional closed circuit cooling make-up and overflow waters are also discharged to the pond from the Ash Grove facility. Additionally, ready-mix truck washout not used in the adjacent Stoneway Concrete recycling/re-use process is diverted to the pond area. Pond water has been recycled into the cement process in the past and

was also used for dust suppression and lawn irrigation around the facility. Since the installation of a cooling tower in 1969, only 3% of the cooling water now goes to the pond.

The collected pond water is detained in the pond before slowly seeping into the adjacent soils and out of the pond. Water collected in the pond is treated through the addition of pH-neutralizing agents (sulfuric acid) which buffer the high pH evident in some of the process waters. The pond also acts as a settling basin.

The Ash Grove pond is regulated by the Washington Department of Ecology under State Waste Discharge Permit 5162. Since 1969, the facility has maintained this permit which allows for discharge via seepage to the Duwamish and groundwater

DESIGN PROCEDURE

Ash Grove proposes to develop the pond area and intends to fill the existing pond.

The City of Seattle and Metro maintain public sewer systems east of the project site in East Marginal Way South. The availability and close proximity of those utilities to the facility offer a reasonable alternative to the pond. However, because the Metro line is an old combined sewer (sanitary and storm flows) and may be replaced sometime in the future with a sanitary-only line, combined flows are being discouraged. Thus it is necessary to separate stormwater flows from any process flows and discharge separately into Metro and the City storm sewer.

The City of Seattle regulates the public storm sewer system in Marginal Way. This system flows south to north along the east edge of the Stoneway facility. A fifteen inch trunk runs parallel to the east property line for approximately 300'. A manhole located approximately 130 feet south of the northeast property corner joins the fifteen inch pipe with one eighteen inches in diameter. This pipe directs storm flows northward, away from the site.

We have discussed this matter with officials from City of Seattle (Plan Review and Drainage & Wastewater Utility departments), Metro, Washington DOE, Northwest EPA and others to determine the most practical solution to this problem. After several preliminary analyses, the following scheme was developed:

1. Separate stormwater flows from other on-site operation discharges. Essentially, this involved two steps. The first occurred when Stoneway Concrete obtained a Metro permit for minor discharge of their recycling water to the

combined sewer located in East Marginal Way South.

When Stoneway connects to Metro, a primary wastewater constituent will have been eliminated from the Ash Grove collection system.

The second step toward achieving separation of stormwater from wastewater on-site would be the acquisition of a similar Metro permit by Ash Grove. Other than the Stoneway discharge, the only other wastewater entering the existing pond is truck wash runoff originating from a rack located near the northeast entrance into Ash Grove. We have met with Jim Sifford (Metro Industrial Waste Investigator) and Ash Grove is currently applying for a Metro permit which will allow direct discharge of wastewater to the Metro combined sewer located in Marginal Way. Upon connection to Metro by Ash Grove and Stoneway, the discharge to the existing pond area will consist of stormwater only.

2. Discharge stormwater to City of Seattle public storm sewer.

After discussing this matter with Neil Thibert and Joe Tallbot (City of Seattle Engineering) it became evident that the existing storm sewer in Marginal Way might be considered. Neil Thibert had his staff perform an in-house analysis of the storm sewer system to assess the extent of this capacity. These results were sent to our office April 8, 1991, (see attached letter). According to the City analysis, capacity of the public storm sewer ranged between 2.0 cfs (tie to 15" storm sewer) and 6.9 cfs (tie to 18" storm sewer) for a 25-year storm event (phone conversation with Sylvia von Aulock, April 3, 1991). After developing cost estimates for various alternatives, Ash Grove opted to connect to the existing 18" City storm sewer.

3. Develop Detention Requirements

The City of Seattle normally limits outflows from site development to 0.2 cfs per acre. However, with the surplus 6.9 cfs capacity available in the City storm sewer adjacent to the site, the release rate for Ash Grove equates to 0.31 cfs/acre. Since the City table utilized for detention sizing (Table A, "Stormwater Detention Sizing Calculations") is based on a 0.2 cfs/acre release rate, it was necessary to develop a similar table which would account for a 0.31 cfs/acre release. Before moving in this direction, we met with Neil Thibert and Sylvia von Aulock (Tuesday, May 7, 11:00 am) to ensure that the proposed methodology was acceptable to them. Mr. Thibert agreed with our proposal, and provided us with information and names of people involved in the original development of Table A.

The methodology utilized to determine detention requirements based on a release rate of 0.31 cfs is outlined in detail in the attached computations. Briefly, the procedure can be summarized as follows:

- a. The detention sizing methodology utilized is the "Yrjanainen and Warren Method" (Y & W Method). The table developed by the City is based upon local equations derived by King County in their 1979 Drainage Design Manual.
- b. Randy Snow (King County Surface Water Management) provided our office with the peak storage time and maximum storage volume equations utilized in the above reference.
- c. Neil Thibert provided our office with the original Y&W paper published in a 1972 issue of Water and Sewage Works.
- d. Using the above references, the original equations resulted in a detention facility at Ash Grove sized at 21,700 ft³ (based on assumed release rate of 0.2 cfs/ac and the 25-year storm). This was within 0.5% of the value obtained using Table A (see attached comps).
- e. Satisfied that the equations developed by King County would match the results found in City "Table A", we proceeded to analyze detention requirements using a 0.31 cfs/acre release rate.

Detention volume requirements for both the 10-year and 25-year storm event were determined, based on a drainage area of 22.27 acres and a fully-developed "C" factor of 0.60 (determined using planimetered topographic map and verified by Metro assessment of property). Per our meeting with Neil Thibert, the system was designed to handle flows associated with the 10-year storm event. Further, the 25-year storm was evaluated to determine its impact on the proposed detention facility. The 10-year storm was analyzed using an orifice-controlled outlet condition; the 25-year storm utilized a constant-flow (pump) discharge relationship. This approach best models the proposed pumping scheme which incorporates a flow-control manhole located directly upstream of a pumping vault (see plan). This pumping system employs two Flygt submersible pumps which are activated by two (2) sets of turn on/off floats set at various water levels within the pump vault. Each pump is rated to discharge

3.45 cfs into the public storm sewer. During most storm events, the outflow from detention will be regulated by a restricted outflow (orifice) which will control release into the pump vault. The first pump will activate after the water level has risen in the vault and will continue to pump until the water level receded to that which occurred prior to the storm. The second pump will activate only when a large storm event causes detention capacity to approach the overflow level. When this occurs, both pumps will be activated and outflow will be dictated by the constant rate condition of both pumps operating at full flow capacity (6.9 cfs). Thus, for large storm events (in theory, the 10-and 25-year events) the system will actually discharge at a rate which equates to 0.31 cfs/acre. However, for most storm events, the detention outflow of 0.16 cfs will actually be less than the 0.2 cfs/acre City requirement. During larger storm events, it is anticipated that water will temporarily back up into a proposed settling basin and some of the low areas around catchbasins on site.

- f. Based on our findings, the detention plan was sized to accommodate 12,500 cubic feet of surplus runoff. Outflow to the City system will be regulated by a controlled flow-control manhole/overflow/pumping arrangement designed to accommodate the 10-year storm with additional provisions made for the 25-year event.

PROPOSED PLAN

After determining the detention requirements, the remainder of the drainage scheme was developed to best incorporate the drainage plan previously submitted to Neil Watts. The following summarizes what is detailed on the enclosed plans.

- a. Collection System: The on-site catchbasin and area drain scheme proposed in the original submittal to the City will be maintained.
- b. Settling Basin: A concrete settling basin will be installed directly upstream of the proposed detention area. This structure has been designed in a manner which will allow for entry of a front-end loader to remove accumulated solids from the basin.
- c. Detention Pipe: A manhole will be installed over the existing 18" diameter pipe which currently discharges to the pond. This manhole will direct the water into the proposed subsurface pipe system, which will consist of two (2) 270 foot lengths of 55"x73" corrugated metal

pipe arch joined at one end. This pipe will comply with City of Seattle standards for Asphalt Treatment #1 and has been designed to withstand the loads anticipated on-site.

- d. Flow Control Manhole: Low flow discharges from detention will be regulated by a flow-control manhole as required by City drainage/detention policy. Orifice size is designed to restrict maximum discharge to the pumping vault to 6.9 cfs.
- e. Pumping System: As previously discussed, two (2) Flygt submersible pumps will provide the lift to discharge the regulated flows to a manhole located approximately 1200 (?) feet to the northeast. A pump curve for the Flygt 3152 is enclosed. A vault has been designed to accommodate the dual pump system and this is detailed on the plans.
- f. Pressure Line: Each pump will discharge into 8" diameter ductile iron pipe currently utilized in a cooling circulation system by Ash Grove. This system will be abandoned in the area of the proposed pump vault. The existing pipe system will be modified to connect to the pump vault and approximately 300 (?) LF of the existing dual 8" diameter DIP will be utilized in the proposed detention pumping scheme. These two pipes will connect to a proposed 14" diameter DIP length which will extend ____ LF to a manhole located near the northeast entrance to Ash Grove (see plan). This 14" diameter pressure pipe segment will be buried in a polywrap encasement for most of the distance. However, for approximately ____ feet, the pipe will be placed above ground on concrete pedestal supports along an existing concrete wall. This is proposed to eliminate excavation in an area that is surfaced with concrete and contains many underground utilities. Details relating to structural elements associated with the aboveground supports are shown on the plans.
- g. Connection to City Storm Sewer: The pressure line is proposed to connect to a manhole located near the public right-of-way on Ash Grove property. At this location, a gravity line (15" diameter reinforced concrete pipe) will extend to the existing 18" diameter pipe located in Marginal Way. A profile of this proposed connection is shown on the plans. Elevations and locations are derived from City sewer cards and are approximate. If actual cover over the gravity pipe is less than 30", ductile iron pipe and a design connector will instead be utilized, per City standards. Our

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design assumes that the existing 18" City pipe is concrete per phone conversations with City Engineer.

- h. Existing Pond: As previously mentioned, the pond currently utilized by Ash Grove will be filled. Upon successful completion of this project and hookup to the City of Seattle and Metro systems, the existing DOE permit will be vacated. Kevin Fitzpatrick of DOE has assured us that Metro will coordinate with his department in this regard.

We feel that it is imperative that coordination be maintained throughout this project. We would appreciate any input you may have relative to coordinating between the City, Metro and DOE on this job. To date, the City has been most cooperative in developing a solution to the Ash Grove drainage situation. Please do not hesitate to contact our office should any questions arise in this plan review.

Sincerely,

KLEIN CONSULTING ENGINEERS, INC.

Dan Keppen

DK:rw

cc: Neil Thibert, City of Seattle Drainage & Wastewater Utility
Nate Fernow, Ash Grove Cement West
Steve Rinella, Smith & Monroe & Gray Engineers, Inc.